POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, April, 12, 1866, the President, Prof. S. D. Tillman, in the chair.

THE WAY TO MAKE A FILTER.

Mr. Thompson, of Cayuga, N. Y., described his method of making a filter. He divides a deep wooden tub by a tight vertical partition through the middle, perforating the partition at the bottom with numerous small holes. The tub is nearly filled on both sides of the partition with granulated charcoal made from sugar maple, and screened through a mesh of one-sixteenth of an inch, the fine dust being separated by bolting. The foul water enters the tub on one side at the top, passes downward and through the small holes in the partition, and rises upward on the other side, leaving its impurities, both solid and gaseous, in the charcoal.

Mr. Thompson stated that one practical difficulty that he had encountered in filters was the adhesion of the water from cohesive attraction to the walls of the filter, down which it flows in narrow channels without passing through the purifying material. To remedy this he now surrounds the filter on the inside with a series of narrow ledges, sloping downward and inward, which conduct all the water into the body of the charcoal.

The best wood for making charcoal for filters is boxwood, but it is impossible to obtain enough boxwood for the purpose. The wood that comes next to this in excellence is sugar maple, and this, consequently, is employed. It must be burned twice, once under turf, and afterward in a tight retort or cylinder, the combustion being continued till all the gaseous products are expelled.

Charcoal is far better to catch the solid impurities in water than sand, or even than broken quartz. If carefully burned and granulated, so as to preserve the fibrous structure, each one of the little pores may be seen under a microscope surrounded by a serrated edge, presenting the best surface possible for arresting any matter floating in the water. As in addition to this power of mechanically separating the solid impurities, charcoal possesses in the highest degree, the power of absorbing the gases held in solution by water, it is, unquestionably, the best of all materials for filters.

Mr. Thompson said that his filters would occasionally become fouled, and the water for a few days would be unfit to use; the filter would become clear again and the water would be as sweet as ever. He asked for an explanation of this action.

[The explanation is doubtless this: The solid organic matter collects in the filter until it has accumulated in sufficient quantities to induce decomposition, when it gives off carburreted and sulphurreted hydrogen, and the other offensive gases which are the usual products of animal and vegetable decay.—EDS. SCI. AM.]

Professor Everett remarked in relation to the method of preparing the charcoal, that if Mr. Thompson would examine the mode followed by powder makers, he would find it more simple than the one that he had described.

Dr. Parmelee observed that the best filtering is soft brick.

PEAT.

The President announced the regular subject of the evening, which was peat. A long discussion followed, but we report for our columns only the statement of—

Mr. Hirsh. At a previous meeting the assertion had been made that in refining sugar, peat charcoal would decolorize the sirup as well as bone charcoal, and Mr. Hirsh, being engaged as a chemist in a sugar refinery, decided to try the experiment. Into each of seven glass beakers, he put 15 grammes of peat charcoal, and into another beaker of the same form and size 15 grammes of bone charcoal. A glass tube was inserted into each beaker, with its lower end to the bottom of the beaker, and through these the coal was saturated with dark-colored sirup. After standing three hours—the usual time in large operations—the sirup was forced out at the top of the beakers by fresh charges poured through the tubes. That which had passed through the bone charcoal was perfectly white, while that which had passed through the peat was only partially discolored.

Mr. Hyde remarked that the peat used in this experiment had been burned four years, whereas it should be freshly burned.

ILLIG AND NEUBERGER'S FRUIT CAN.

The old way of preserving fruit for winter use was, as all persons know, to use an inordinate quantity of sugar and boil the fruit in the same till it lost all flavor. The result was an unwholesome preparation, totally devoid of the natural flavor of the fruit. A vast improvement on this is the method now in vogue of scalding the fruit and sealing it up hot in its own juice, in cans or jars made for the purpose.

These engravings represent an improved can for the purpose, which is admirably adapted for its object. The can has a tin cover, A, fitting over a projecting rim on the body of it; said rim having a rubber joint or gasket, B, let into a recess so that it cannot slip off. When the fruit is in and properly scalded, the cap is pushed down and immediately seals it up from contact with the air.

It sometimes happens that the steam from the scalding fruit lifts the cover again, so that air is admitted and the contents spoiled unless some one places a weight on top to keep it down; where there are many hundred cans in preparation at once this is a troublesome piece of work, and therefore the inventors provide two small buttons, C, which hold the cover firmly in place and prevent the evil referred to. This can has been in use one season, and is highly approved. The inventors wish to sell State, county, or shop rights to manufacture. For further information address Illig & Neuberger, 137 Clinton street, Buffalo, N. Y., by whom it was patented on April 11, 1865.

PROF. DOREMUS'S LECTURES.

At eight o'clock in the evening of Tuesday, April 17th, the Academy of Music, in Brooklyn, was filled from floor to dome with the best citizens of the place to listen to the first lecture of Professor Doremus's course, which he entitles "Views of Life through the Medium of Natural Science."

These lectures are an enterprise of the Mercantile Library Association, of Brooklyn, which has appropriated $3,500 for the experiments; $2 is charged for admission to each lecture, or $5 for the course of three. The stage was covered with tables loaded with elegant apparatus, all of the largest dimensions, and the scene painter had been employed to produce geological illustrations on a gigantic scale. As the lecturer spoke constantly from eight till half-past ten, it is impossible for us to give a verbatim report of his remarks; we select a few of the more interesting portions:—

THE THREE STATES OF MATTER.

After a brief and eloquent introduction, the speaker said that he should consider matter first in its three forms—solid, liquid, and gaseous, and the relations of these three forms to heat. He would exhibit experiments to show that when matter changes from the gaseous to the liquid state, or from the liquid to the solid, heat is generated; also other experiments to show that when matter changes in the reverse way, from the solid to the liquid, or from the liquid to the gaseous, heat is absorbed, or cold is produced.

THE COLOR OF GASES.

First, he would call the attention of the audience to the properties of gases. They are all transparent, and most of them are white and invisible, though a few are delicately colored. "This vase is filled with bromine gas, which is red, as you see. This contains chlorine, which derives its name from its green color. If I turn this vase over, which contains hydrochloric acid, those near the stage will perceive that some gases are possessed of odor as well as color."

THE WEIGHT OF GASES.

On the stage was a pillar some ten feet in hight, supporting at its top a balance beam about eight feet in length, from the ends of which were suspended scales of the same proportions. On one scale was an empty barrel, exactly poised by weight in the opposite scale. Two assistants took up a barrel of carbonic acid gas, and poured it into the barrel upon the scale. Of course the operation presented exactly the appearance of pouring nothing from an empty barrel; but the carbonic acid, being about once and a half heavier than atmospheric air, was poured as water would have been, and its weight was shown by the immediate tipping of the beam.

The weight of carbonic acid gas was exhibited in another manner not less impressive. A large tank full of the gas had been fixed among the scenes, at an elevation of some fifteen feet, and from the bottom of the tank at the front side a trough, ten or twelve feet in length, inclined downward at an angle of 45°. Two rows of short candles were burning in the bottom of the trough, and just beneath its lower end was hung a light overshot wheel, four feet in diameter, made of paper and laths. At a signal, an assistant, by pulling a string, opened a door in the side of the tank at the upper end of the trough, when the invisible gas flowed downward through the trough, extinguishing the candles in succession, and when it poured from the lower end upon one side of the overshot wheel, the wheel began slowly to revolve.

CARBONIC ACID.

"This vase is filled with carbonic acid. You see that it is as transparent and invisible as the atmosphere. I will dwell for a moment on its properties in consideration of the great part which it performs in the life of our globe. It is composed of carbon and oxygen. When it enters the leaves of vegetables it is decomposed by the force of the sunbeam; the oxygen returns to the atmosphere and the carbon enters into the composition of the grains and the roots that we eat. This gas is the supporter, therefore, of vegetable life—the original source from which we derive the food that sustains our own existence. The oxygen exhaled by the vegetable enters our bodies through the skin, as well as through the lungs, and coming again in contact with the carbon of our food enters into combination with it, and this gas is again produced. By this combination the heat of our bodies is maintained. Like Shadrach, Meshach, and Abed-nego, we are constantly burned without perceptible change. From this gas, then, we are originally formed, and to it principally we return. It is the alpha and omega—the beginning and the end of life."

THE PECULIAR COLDNESS OF SHERRY COBLERS.

Among the experiments intended to illustrate the absorption of heat when bodies are changed from the solid to the liquid state, was one which was thus described, as it proceeded:—

"If I put some water into this tumbler, add a little ice which is at the temperature of 32°, a little sherry wine, and a little sugar, and agitate the mixture till the sugar is dissolved; on introducing the thermometer into the liquid, I find the temperature is several degrees below that of the ice at the beginning. Those who have observed the peculiar coldness of a sherry cobler, will understand that it is due to the absorption of heat by the sugar in passing from the solid to the fluid state."

BURNING OF EXPLOSIVES IN VACUO.

After several other experiments similar to those o